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gent collector will scarcely need directions on those points.

Of course all this is intended to illustrate New York archeology, but this has relations to other parts of the land, and some cabinets contain fine and valuable specimens from other states. These are not to be overlooked, and I have several such cabinets in my mind. They are interesting in themselves and valuable for comparison.

This communication will not directly reach all those whose aid is desired, but if others will call attention to it good results may be expected. I am often surprised at finding some article of special interest in some hitherto unknown collection. Hence the importance of reaching every student of this great subject. May I hope for a speedy and general response from those interested.

W. M. BEAUCHAMP.

204 MAPLE ST., SYRACUSE, N. Y.  
October 22, 1902.

#### PRICKLES OF THE PRICKLY ASH.

It might be well to call attention to an error occurring in Bailey's 'Elementary Text-book of Botany,' 1901, p. 105, figure 157, where it states that the 'prickles' of the prickly ash are modified stipules. Seeing that the same error occurs in Bailey's 'Encyclopedia of Horticulture,' it may be supposed that it is not a mere typographical error.

In the case of the prickly ash, *Xanthoxylum americanum*, Mill., the prickles are true prickles, having no connection with the internal structures, as they would have if they were stipular in nature. These prickles occur frequently at the bases of the leaves, giving rise very probably to the false notion as to their morphology. However, they do not occur at the bases of all the leaves, there being not infrequently no signs of them. Furthermore, they are occasionally found elsewhere, on the branch, and also on the rachis of the compound leaf.

In Chapman's 'Flora of Southern United States,' 1897, it states, under family characters, 'exstipulate leaves,' and, under *Xanthoxylum*, 'trees or shrubs, commonly armed with stipular prickles.'

Gray states, as a character of the order, 'stipules none,' and, under *Xanthoxylum*, 'stems and often leaf stalks prickly.' Gray is correct, but Chapman, with many others, is in error. The structures referred to are not stipular, but are true prickles. Stipules are not found in any of the genera of the family to which *Xanthoxylum* belongs.

J. B. DANDENO.

#### THE NEXT ERUPTION OF PELÉE.

In the Boston *Transcript* of September 3, 1902, the writer called attention to the peculiar sequence of eruptions in Martinique, as follows:

Date.	Preceding Interval.	Violence.
May 5.		Destruction Guerin Factory.
May 8.	3 days.	Destruction St. Pierre.
May 20.	12 days.	Further destruction St. Pierre and destructive wave at Carbet.
June 6.	17 days.	More incandescent material.
July 9.	33 days.	Larger stones at Morne Rouge; more incandescent material; detonations heard at Barbados.
Aug. 30.	52 days.	Destruction of Morne Rouge: great wave; many lives lost.

It will be seen that the interval is increasing and each time the culminating explosion of steam and hot waters has been somewhat more violent, though until recently there have been no good records kept. At present Lacroix is recording the phenomena from day to day. There were minor eruptions other than those above recorded, notably on May 26, three times in June, and after August 21; but those tabulated may be described as eruptions of first magnitude.

Exploration of the craters has shown that they contain boiling water during periods of calm, and the eruptions begin with the ejection of this water; steam follows, charged with débris. An eruption of this kind is comparable to a geyser. If such comparison is permissible, the sequence may indicate for each great eruption a release of strain and an increased cavity system, allowing infiltration of larger volumes of water, and requiring a

longer period in consequence before explosive conditions are again reached.

With the kind assistance of Professor L. S. Marks, the writer has attempted to determine the next date when Pelée is likely to erupt violently. Lacroix's latest observations, of November 4, indicate that the volcano is still intensely active, and this suggests that the *final* culmination did not come in August, as was the case with Krakatoa. An examination of the intervals and their differences shows that no simple arithmetical law will serve for the progression shown. A graphical solution may be obtained by plating a curve for the known intervals and extending this curve to cover the next interval. Professor Marks used this method; the extension of a smooth curve through the dates from May 8 to August 30 inclusive indicates that the next interval is about 112 days, if the same law holds. There is no simple analytical solution of the curve.

This would give December 20 or thereabouts as the date of the next great eruption of Mont Pelée. A French astronomer has predicted an eruption December 16,\* because at that time the moon will be full, and when over Martinique will be at that point in her orbit nearest to the earth, and hence the lunar pull will be at a maximum with reference to any possible local instability in the earth's outer rock-film. It has been suggested that earlier eruptions were in singular coincidence with moon phases.

So far as prediction is possible, therefore, on the basis of such insufficient data, two lines of reasoning suggest mid-December as a time when a great eruption of Mont Pelée is likely to occur.

T. A. JAGGAR, JR.

HARVARD UNIVERSITY,  
November 18, 1902.

#### SHORTER ARTICLES.

##### THE ETHNOLOGICAL SIGNIFICANCE OF ESOTERIC DOCTRINES.

IN recent years the study of the esoteric teachings found in American tribal society has become one of the favorite subjects of research of ethnologists. The symbolic sig-

\* *L'Opinion*, Fort de France, Martinique, October 21, 1902.

nificance of complex rites, and the philosophic views of nature which they reveal, have come to us as a surprise, suggesting a higher development of Indian culture than is ordinarily assumed. The study of these doctrines conveys the impression that the reasoning of the Indian is profound, his emotions deep, his ethical ideals of a high quality.

It seems worth while to consider briefly the conditions under which these esoteric doctrines may have developed. Two theories regarding their origin suggest themselves: the esoteric doctrine may have originated among a select social group, and the exoteric doctrine may represent that part of it that leaked out and became known, or was made known, to the rest of the community; but it may also be that the esoteric doctrine developed among a select social group from the current beliefs of the tribe.

It seems to my mind that the second theory is the more plausible one, principally for the reason that the contents of the teachings among different tribes are often alike, no matter how much the systems may differ. Almost all the rituals that are the outward expression of esoteric doctrines appear to be old, and many have probably existed, almost in their present form, for considerable periods. Nevertheless, there is ample evidence of frequent borrowing and changes of sacred rites. Examples are the Sun Dance, various forms of the Ghost Dance, and the Mescal ceremonials. Miss Fletcher has called attention to the fact that Pawnee rituals have influenced the development of the rites of many tribes of the Plains. I might add similar examples from the Pacific coast, such as the transmission of Kwakiutl rituals to neighboring tribes.

There is also abundant proof showing that the mythologies of all tribes, notwithstanding the sacredness of some of the myths, contain many elements that can be proved to be of foreign origin. It seems very likely that similar conditions prevailed in the past, because the wide distribution of many cultural features can be understood only as the effect of a long-continued process of borrowing and dissemination.

Since the esoteric teaching refers to the